

SECTION VII.—WEATHER AND DATA FOR THE MONTH.

WEATHER OF SEPTEMBER, 1918.

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PRESSURE AND WINDS.

The distribution of the mean atmospheric pressure over the United States and Canada, and the prevailing direction of the winds for September, 1918, are graphically shown on Chart VII, while the means at the several stations, with the departures from the normal, are shown in Tables I and III.

The average barometric pressure for September was above the normal throughout the whole country, except from the Lower Lakes eastward to the Atlantic Coast, and locally in the Pacific Coast States, where it was slightly below. The departures were generally small, however, except over the Missouri Valley, and thence into the Canadian Northwest Provinces, where they were comparatively large. A more detailed discussion of the daily movements of the important cyclones and anticyclones will be found under Forecasts and Warnings.

The general distribution of the barometric pressure favored northerly winds along the Atlantic and east Gulf coasts as well as in the upper Lake region and westward to the Rocky Mountains, while in the Great Central Valleys and the southern Plains States they were locally from the South. Elsewhere variable winds prevailed. The month was notably free from high winds or destructive storms, the maximum velocities reported reaching 50 miles or more in only a few instances.

TEMPERATURE.

September opened with cold weather in the northern Plains States and the Northwest, accompanied by killing frost or freezing temperature in portions of North Dakota and Montana, but in most eastern districts the temperature was generally above the normal. Cooler weather overspread most central and eastern districts about the middle of the first decade, but during the next few days somewhat higher temperature prevailed. However the decade closed cool for the season over the northern portion of the country, with heavy frost in upper Michigan and the northern portions of Minnesota and Wisconsin. Early in the second decade temperatures were below normal generally east of the Rocky Mountains, except in the Northeast, while over the Pacific Coast States they were generally above. During the next few days there was some warming up in most interior districts, but about the middle of the month colder weather again overspread the western districts, and freezing temperatures were reported as far south as northeastern Colorado and northern Nebraska. For several days following, the weather was much colder from the Rocky Mountains and Texas northeastward. The decade closed unseasonably cool in the northern Plains States, with freezing temperature over considerable areas; but it was warmer in the far Northwest.

At the beginning of the third decade cooler weather overspread the Atlantic Coast and Gulf States, and the lowest September temperatures of record occurred at some points in the latter district. Elsewhere the weather continued generally cooler than normal, except in the Plains region where seasonal warmth prevailed. Somewhat warmer weather overspread most central districts about the middle of the decade, but toward the latter part of the month there was a substantial fall in temperature over the interior districts and the Middle and North Atlantic Coast States, with frost in the upper Mississippi Valley and the Lake region. The month closed with cooler weather and frost in the Northwest, the Ohio Valley, the Lake region, and the interior portions of Pennsylvania and New York.

As a whole, September was abnormally cool in nearly all districts east of the Rocky Mountains, particularly from the central Mississippi and Ohio valleys northward and northwestward, where the deficiencies of temperature averaged from 6 to 8 degrees a day. In many of the States the average temperature for the month was lower than for any other September in the past 30 years or more. Killing frost and freezing temperature occurred during the first decade of the month in North Dakota and northwestern Minnesota, and by the close of the month the frost line had advanced southward over most of Kansas, to northwestern Missouri, eastern Iowa, northern Indiana, northwestern Ohio, and over the Appalachian Mountain district southward as far as West Virginia. To the westward of the Rocky Mountains, however, the month was warmer than usual in most districts, especially in the far Northwest, where the temperature in some localities averaged 6 degrees a day above the normal.

PRECIPITATION.

During the first few days of the month rain fell quite generally east of the Rocky Mountains, the falls being heavy to excessive in portions of the lower Missouri and upper Mississippi valleys, and again for several days following the middle of the decade showers prevailed over much of the East and Northeast sections. The decade closed with rain in the central Rocky Mountain and Plateau States, the upper Mississippi Valley, and the Lake region. During the early part of the second decade rain fell over the central and northern districts east of the Mississippi River, and within the following few days rain occurred in California and the central plateau and Rocky Mountain States, the falls being unusually heavy for the season in northern California. About the middle of the month unsettled, showery weather prevailed in central and northern districts from the Rocky Mountains eastward, and continued quite generally over this area until the close of the second decade. During the first few days of the third decade rain fell in the central and northern plateau and Rocky Mountain districts, and local showers occurred in the Lake region and to the eastward. About the middle of the decade rain was quite general in the Southern States, heavy in some localities, and unsettled,

showery, weather prevailed in the Northeast. Showery weather continued for several days in the Northeast and Southeast, and the month closed with rain in the central and northern Rocky Mountain and plateau regions.

For the month, as a whole, there was a moderate amount of rainfall in most sections east of the Rocky Mountains, except in the north Central States and over much of Louisiana and Texas. Rather heavy amounts occurred in the lower Missouri and central Mississippi valleys, and northeastward over the lower Lakes to New England, and in portions of the South Atlantic and East Gulf States. The largest totals for the month occurred in southeastern Florida, where more than 12 inches fell. Heavy rain for the season occurred in northern California, where at points the fall was greater than for any previous September in the past 40 years; and amounts somewhat above normal were received locally in the northern plateau and Rocky Mountain districts. Very little rain occurred in the far Northwest, where considerable amounts are usually received during September, and in much of the far Southwest the month was practically rainless.

Heavy snow was reported from some of the mountains of northern California near the middle of the month, and near the close there was a light fall generally over the high Sierra.

RELATIVE HUMIDITY.

The relative humidity was generally above the normal from the Lake region and Ohio Valley northeastward, and from the Rocky Mountains westward, except in the far Northwest. Elsewhere the atmosphere was relatively drier than usual for this season of the year. Over central and northern California, and at points in the plateau region, the relative humidity was from 10 to 20 per cent above normal, while in portions of the lower Missouri Valley the deficiency was nearly as great.

GENERAL SUMMARY.

September, 1918, was unseasonably cool in most central and northern districts and corn matured rather slowly, particularly in the eastern sections. However, the crop was so far advanced over the principal corn-growing States that on the whole no great damage resulted from frost, although in small areas the damage was considerable.

The weather was rather unfavorable for further cotton growth throughout much of the belt, and the condition of the crop in many sections was not satisfactory. However the weather was generally favorable for picking and ginning. Conditions were generally favorable for winter-grain seeding and this work made good progress. Potatoes and garden truck were damaged by frost in some northern sections. Pastures generally remained in good condition during the month and live stock continued to improve. The weather was mostly favorable for harvesting of fruit, although in California considerable damage resulted to drying fruit and to other agricultural products, due to frequent showers and lack of sunshine.

Average accumulated departures for September, 1918.

Districts.	Temperature.			Precipitation.			Cloudiness.		Relative humidity.	
	General mean for the current month.	Departure for the current month.	Accumulated departure since Jan. 1.	General mean for the current month.	Departure for the current month.	Accumulated departure since Jan. 1.	General mean for the current month.	Departure from the normal.	General mean for the current month.	Departure from the normal.
	<i>° F.</i>	<i>° F.</i>	<i>° F.</i>	<i>Ins.</i>	<i>Ins.</i>	<i>Ins.</i>	<i>0-10.</i>		<i>P. ct.</i>	
New England.....	58.3	-2.2	-10.7	5.60	+2.40	-2.90	6.4	+1.2	81	0
Middle Atlantic.....	62.2	-3.5	-4.1	3.49	+0.10	-4.00	5.1	+0.4	75	-3
South Atlantic.....	70.2	-2.9	+1.6	3.62	-1.00	-12.20	4.7	+0.1	78	-3
Florida Peninsula.....	80.5	-0.7	+3.3	6.33	-1.60	-15.00	5.2	0.0	77	-4
East Gulf.....	71.8	-3.0	+4.3	4.18	+0.30	-4.50	4.8	+0.3	75	-3
West Gulf.....	72.8	-2.6	+5.2	2.58	-0.90	-9.00	3.6	-0.5	67	-7
Ohio Valley and Tennessee.....	62.1	-5.8	-5.5	2.96	+0.20	-3.90	5.3	+0.9	74	0
Lower Lakes.....	58.8	-6.3	-9.7	4.74	+1.90	-1.40	6.5	+1.6	74	0
Upper Lakes.....	53.3	-5.7	-11.3	2.65	-0.60	-3.40	5.9	+0.7	72	-6
North Dakota.....	52.3	-4.9	+7.0	0.38	-1.00	-3.10	4.2	-0.2	68	-1
Upper Mississippi Valley.....	58.9	-5.9	-2.6	2.77	-0.60	-2.30	5.0	+0.6	73	-2
Missouri Valley.....	60.8	-4.5	+10.2	3.08	+0.40	-4.70	4.3	+0.1	64	-4
Northern slope.....	55.8	-1.6	+4.3	1.37	+0.40	+1.40	4.9	+0.8	66	+7
Middle slope.....	63.2	-4.4	+7.1	2.39	+0.40	-1.20	4.1	+0.7	65	+4
Southern slope.....	70.5	-2.3	+11.4	0.95	-1.80	-7.10	3.3	-0.3	59	-6
Southern Plateau.....	71.0	+0.5	-0.3	0.52	-0.50	-0.60	2.4	-0.1	48	+6
Middle Plateau.....	63.5	+1.2	+2.8	1.48	+0.80	-0.40	3.9	+0.9	40	+4
Northern Plateau.....	64.6	+3.4	+13.6	0.35	-0.10	-1.30	4.1	+0.4	53	+3
North Pacific.....	61.4	+3.8	+10.7	0.29	-2.10	-4.40	4.9	-0.5	74	-5
Middle Pacific.....	62.9	-0.6	+3.8	4.04	+3.40	-3.10	5.6	+2.4	75	+12
South Pacific.....	70.3	+3.0	+16.5	0.47	+0.30	+2.80	4.3	+1.6	71	+5

WEATHER CONDITIONS OVER THE NORTH ATLANTIC DURING SEPTEMBER, 1917.

The data presented are for September, 1917, and comparison and study of the same should be in connection with those appearing in the Review for that month. Chart IX (XLVI-83) shows for September, 1917, the averages of pressure, air temperature, water surface-temperature, and the prevailing direction of the wind at 7 a. m. 75th Meridian Time (Greenwich mean noon). Notes on the locations and courses of the more severe storms of the month are included in the following general summary.

PRESSURE.

The distribution of the mean atmospheric pressure for the month presented few unusual features, especially in the southern division of the ocean, as the North Atlantic and Continental highs were nearly normal in position, extent, and intensity. The pressure gradient between the 40th and 60th parallels, east of the 40th meridian, was slightly steeper than usual and the Icelandic low was indicated by an isobar of 29.6 inches.

The following table gives for a number of selected 5-degree squares the average pressure for each of the three decades of the month, as well as the highest and lowest individual readings reported during the month within the respective squares:

Pressure over the North Atlantic Ocean during September, 1917, by 5-degree squares.

Position of 5-degree squares.		Decade means.			Extremes.			
		I	II	* III	Highest.		Lowest.	
Latitude.	Longitude.				Pressure.	Date.	Pressure.	Date.
		Inches.	Inches	Inches	Inches.	Septem-ber.	Inches.	Septem-ber.
60-65 N	20-25 W	29.77	29.40	29.50	30.12	4	29.15	17
60-65 N	0-5 E	29.84	29.50	29.68	30.07	5	29.20	27
55-60 N	35-40 W	29.77	29.52	29.65	30.05	4	29.18	18
55-60 N	10-15 W	29.86	29.60	29.74	30.20	9	29.30	13
50-55 N	55-60 W	29.84	29.93	29.90	30.25	15	29.58	29
50-55 N	25-30 W	29.99	29.30	29.85	30.31	12	29.40	18
50-55 N	0-5 W	30.00	29.95	30.14	30.34	29	29.70	1
45-50 N	65-70 W	30.02	30.18	30.00	30.52	15	29.60	28
45-50 N	40-45 W	30.01	29.95	29.92	30.30	12	29.60	20, 27
45-50 N	10-15 W	30.10	30.13	30.16	30.50	12	29.75	18
40-45 N	60-55 W	30.02	30.06	29.99	30.33	24	29.70	19
40-45 N	25-30 W	30.28	30.20	30.14	30.53	12	29.76	15
35-40 N	75-80 W	30.10	30.14	30.07	30.30	12, 23	29.63	30
35-40 N	35-40 W	30.24	30.20	30.14	30.51	23	29.88	13
35-40 N	10-15 W	30.16	30.14	30.17	30.30	7	30.00	10
30-35 N	50-55 W	30.17	30.14	30.12	30.36	24	29.96	10
30-35 N	25-30 W	30.25	30.16	30.19	30.40	8	29.96	13
25-30 N	90-95 W	30.04	29.94	29.90	30.08	9	29.70	28
25-30 N	60-65 W	30.01	30.04	30.07	30.20	24	29.80	4
25-30 N	15-20 W	30.09	30.05	30.12	30.20	6, 21	30.00	8, 15, 18
15-20 N	35-40 W	30.02	30.00	30.03	30.12	23	29.95	15
10-15 N	80-85 W	29.91	29.88	29.91	29.96	21, 26	29.80	15

* The mean values presented in the above table are based on the interpolated daily pressure for each square on the daily synoptic charts of the North Atlantic, compiled by the Marine Section of the Weather Bureau. The extremes are the highest and lowest actual readings observed within the respective squares.

GALES.

Over the northern steamer lanes winds of gale force were unusually rare, not being reported on more than one day in any 5-degree square. In the waters adjacent to the coasts of North and South Carolina gales were reported on 5 days, which is considerably above the normal, and they occurred on two days in the western part of the Gulf of Mexico, as well as off the southwest coast of Cuba. From the 1st to the 3d a slight depression covered the greater part of the northern steamer routes, and a few reports were received that denoted moderate gales in the central and western sections.

On the 4th there was a well-developed LOW (I on Chart IX) central near Bermuda, where the barometer reading was 29.46 inches. Light to moderate winds were the rule in that locality, although moderate gales prevailed near the 24th parallel and 84th meridian. Low I moved rapidly northeastward, and on the 5th its center was near latitude 39°, longitude 55°; the barometer had risen slightly since the 4th, although the wind had increased to a marked extent, and one vessel in the southeast quadrant reported a southerly gale of over 60 miles an hour. The observer on this ship stated in the storm log that shortly after midnight on the 5th, when the storm was at its height, the barometer reading was 28.20 inches, and the wind blew with hurricane force from the east-northeast. The disturbance then diminished very rapidly in intensity, and at Greenwich mean noon on the 6th it had practically disappeared, light to moderate winds prevailing. From the 7th to the 11th no material depressions or heavy winds were reported.

On the 12th the center of a LOW of 29.82 inches was about 200 miles south of Jamaica, and at the same time a HIGH with a crest of 30.26 inches covered a portion of the American coast between Portland and Norfolk. A number of vessels off Hatteras encountered northeasterly gales of from 40 to 50 miles an hour, with accompanying barometric readings of from 30.06 to 30.17 inches.

On the 13th a LOW of considerable extent, and with rather indefinite limits, extended from the 10th to the 35th meridians, north of the 60th parallel, and vessels near latitude 58°, longitude 30° reported "straight" westerly gales of about 50 miles an hour. This disturbance was practically stationary from the 14th to the 19th, conditions of wind and weather within this region varying but little during the period.

On the 16th and 17th there was a slight depression off the coasts of Virginia and North Carolina, while on the same date a well-developed HIGH covered the greater part of eastern Canada. Moderate northeasterly gales prevailed along the coast between Hatteras and the Delaware Capes, while to the north and south of these limits light to moderate winds were the rule. The LOW drifted slowly northeastward, increasing slightly in intensity, and on the 18th the center was near latitude 41°, longitude 68°, and westerly winds of gale force were reported from a limited area in the southerly quadrants.

On the 23d a LOW (II on Chart IX) was central near the east coast of Cuba which, though of slight intensity at that time, afterwards developed into a tropical hurricane of considerable violence. Low II moved due west, and on the morning of the 24th was near latitude 20°, longitude 60°. The winds in that locality were comparatively light, although over a limited area off Hatteras northeasterly gales of from 40 to 65 miles an hour were encountered. The LOW then curved toward the northwest, reaching the Isle of Pines on the 25th, the weather conditions being about the same as on the previous day. Northeasterly gales of somewhat diminished force still prevailed along the coast between Hatteras and New York, the maximum velocity being about 40 miles an hour. Low II continued on its northwesterly course, and on the 26th the center was near latitude 25°, longitude 84°; it had increased considerably in intensity, and moderate southeasterly gales prevailed in the northeast quadrant at the time of observation, while one vessel at 2 p. m. September 26, near latitude 26°, longitude 85°, encountered easterly winds of over 60 miles an hour.

On the 26th there was also a LOW of limited area and marked intensity in the vicinity of latitude 44°, longitude 55°. Southwesterly hurricane winds of from 75 to 90 miles an hour were reported near the center, although the storm area was of small extent.

Low II moved rapidly westward during the next 24 hours, and on the 27th covered the central portion of the Gulf of Mexico. Southeasterly winds of hurricane force were reported in the northeast quadrants, accompanied by torrential rains. The northern LOW of the 26th had practically disappeared, and the force of the wind diminished materially. On the 28th low II had reached its greatest force, with its center a short distance south of Mobile, and a minimum barometric reading of 29.18 inches. It was accompanied by northeast hurricane winds of over 90 miles an hour and heavy rains. It then diminished very rapidly in intensity, and on the 29th the center was near Pensacola, where the barometric reading was 29.62 inches, with light to moderate winds prevailing.

AIR TEMPERATURE.

The average monthly temperature of the air over the ocean did not differ greatly from the normal, although in a limited area off the Banks of Newfoundland it was from 2° to 5° warmer than usual, and in the northeast trade-wind regions the positive departures ranged from 1° to 3°.

The seasonal fall in temperature during the month was marked in northern waters, in some localities the mean for the last decade being from 2° to 3° below that of the first. The fluctuations in temperature from day to day were not large, and in the square that includes the east coast of Labrador, where they are usually the greatest, the thermometer readings ranged from 47° on the 24th to 55° on a number of days in the first part of the month.

The following table gives the temperature departures for the month at a number of Canadian and United States Weather Bureau stations on the Atlantic and Gulf coasts.

	° F.		° F.
St. Johns, N. F.	+1.5	Norfolk, Va.	-3.5
Sydney, C. B. I.	+1.3	Hatteras, N. C.	-3.3
Halifax, N. S.	-1.7	Charleston, S. C.	-2.8
Eastport, Me.	-1.0	Key West, Fla.	-0.9
Portland, Me.	-3.2	Tampa, Fla.	+1.3
Boston, Mass.	-2.5	Mobile, Ala.	+0.3
Nantucket, Mass.	-3.1	New Orleans, La.	+0.2
Block Island, R. I.	-3.1	Galveston, Tex.	0.0
New York, N. Y.	-3.5	Corpus Christi, Tex.	+1.4

WATER-SURFACE TEMPERATURE.

Off the Banks of Newfoundland the surface of the water was from 1° to 6° warmer than usual, while in the region between the 30th and 40th parallels and the 50th meridian and the American coast, the departures ranged from 0° to -6°. In the waters adjacent to the European coast small positive departures were the rule,

and in the Gulf of Mexico they were slightly negative, while in the territory south of the 40th parallel, between the 10th and 50th meridians the departures were irregular, ranging from +2° to -2°.

The seasonal fall in temperature of the water was not as large as that of the air, although noticeable in northern waters, while the daily fluctuation was about the same for the two elements.

FOG.

Fog was unusually rare off the Banks of Newfoundland, being reported on 3 days only in that locality, while the normal percentage ranges from 30 to 35. It was observed on 3 days over the shoals of Nantucket, which was also below the normal, though only slightly so. It was somewhat more prevalent than usual over the eastern part of the steamer lanes, and it occurred on 2 days in the Azores, an exceptionally large number for that region.

Winds of 50 mis./hr. (22.4 m./sec.) or over during September, 1918.

Station.	Date.	Velocity.	Direction.
Buffalo, N. Y.	28	56	sw.
Oklahoma, Okla.	1	50	sw.
Salt Lake City, Utah.	3	50	n.